

WHAT IS CLAIMED IS:

1. A vehicle braking control system comprising:
 - a braking mode selecting section configured to set one of a plurality of braking modes as a selected braking mode, with each of the braking modes having a different
5 braking control priority for setting a target regenerative braking force, a target hydraulic braking force and a target electric braking force;
 - a required braking force determining section configured to determine a required braking force for an entire vehicle; and
 - a target braking force setting section configured to set the target regenerative
10 braking force, the target hydraulic braking force, and the target electric braking force based on the braking control priority of the selected braking mode to produce the required braking force for the entire vehicle.
2. The vehicle braking control system according to claim 1, wherein
15 the braking mode selecting section is further configured to include an electric power maintenance priority mode as one of braking modes.
3. The vehicle braking control system according to claim 2, wherein
20 the target braking force setting section is further configured to first set the target regenerative braking force to be produced, second set the target hydraulic braking force to be produced based on the target regenerative braking force previously set and the required braking force for the entire vehicle, and third set the target electric braking force to be
25 produced based on the target regenerative braking force and target hydraulic braking force that were the previously set and the required braking force for the entire vehicle, such that the required braking force for the entire vehicle is produced, when the electric power maintenance priority mode is selected.
4. The vehicle braking control system according to claim 3, wherein
30 the target braking force setting section is further configured to set the target regenerative braking force and the target hydraulic braking force to values that substantially maximize a regenerative braking force that can be generated; and

the target braking force setting section is further configured to set the target electric braking force as a difference between the required braking force for the entire vehicle and a sum of the target regenerative braking force and the target hydraulic braking force.

- 5 5. The vehicle braking control system according to claim 3, wherein
the target braking force setting section is further configured to set the target
regenerative braking force to a value that substantially maximizes a regenerative braking
force that can be generated;
the target braking force setting section is further configured to set a target braking
10 force apportioning ratio having a hydraulic braking force component and an electric
braking force component;
the target braking force setting section is further configured to set a difference
between the required braking force for the entire vehicle and the target regenerative
braking force as a combined target hydraulic/electric braking force; and
15 the target braking force setting section is further configured to set the target
hydraulic braking force and the target electric braking force by apportioning the combined
target hydraulic/electric braking force between the target hydraulic braking force and the
target electric braking force based on the target braking force apportioning ratio.

- 20 6. The vehicle braking control system according to claim 3, wherein
the target braking force setting section is further configured to set the target
regenerative braking force to a value that substantially maximize a regenerative braking
force that can be generated;
the target braking force setting section is further configured to set the target
25 hydraulic braking force by maximizing a hydraulic braking force that can be produced in
view of the target regenerative braking force that was previously set and the required
braking force for the entire vehicle; and
the target braking force setting section is further configured to set the target electric
braking force as a difference between the required braking force for the entire vehicle and
30 a sum of the target regenerative braking force and the target hydraulic braking force.

7. The vehicle braking control system according to claim 3, further comprising

5 a braking force distribution ratio determining section configured to determine a braking force distribution ratio among a set of wheels at a start of braking from the target regenerative braking force, the target hydraulic braking force, and the target electric braking force;

the braking force distribution ratio determining section being further configured to determine the target braking force distribution ratio among the wheels based on at least one operating condition of the vehicle; and

10 the target braking force setting section is further configured to adjust the target electric braking force by asymptotically changing from the braking force distribution ratio among the wheels at the start of braking to a target braking force distribution ratio among the wheels with a passage of time from the start of the braking.

15 8. The vehicle braking control system according to claim 3, wherein the target braking force setting section is further configured to adjust the target electric braking force to substantially maintain electric power consumption of an electric braking device within a limited range.

20 9. The vehicle braking control system according to claim 8, wherein the target braking force setting section is further configured to determine the electric power consumption by the electric braking device based on a power supply voltage and a consumed current of the electric braking device; and

25 the target braking force setting section is further configured to adjust the target electric braking force so that the electric power consumption of by the electric braking device does not exceed an upper limit value of the limited range.

10. The vehicle braking control system according to claim 8, wherein the target braking force setting section is further configured to determine the electric power consumption by the electric braking device based on a drive command of the electric braking device; and

30

the target braking force setting section is further configured to adjust the target electric braking force so that the electric power consumption of by the electric braking device does not exceed an upper limit value of the limited range.

5 11. The vehicle braking control system according to claim 8, wherein
the target braking force setting section is further configured to determine the electric power consumption by the electric braking device based on an operating speed and an operating force of the electric braking device; and

10 the target braking force setting section is further configured to adjust the target electric braking force so that the electric power consumption of by the electric braking device does not exceed an upper limit value of the limited range.

12. The vehicle braking control system according to claim 8, wherein
the target braking force setting section is further configured to adjust the upper
15 limit value of the limited range related to the electric power consumption such that the upper limit value of the limited range is increased on at least one of a battery charging condition improving and a quantity of charge to a battery increasing, and less electric power being drawn from the battery, which is a power supply of the electric braking device.

20 13. The vehicle braking control system according to claim 1, wherein
the braking mode selecting section is further configured to include a braking response priority mode as one of braking modes.

25 14. The vehicle braking control system according to claim 13, wherein
the target braking force setting section is further configured to first set the target regenerative braking force to be produced, second set the target electric braking force to be produced based on the target regenerative braking force previously set and the required braking force for the entire vehicle, and third set the target hydraulic braking force to be
30 produced based on the target regenerative braking force and target electric braking force that were the previously set and the required braking force for the entire vehicle, such that

the required braking force for the entire vehicle is produced, when the braking response priority mode is selected.

15. The vehicle braking control system according to claim 14, wherein
5 the target braking force setting section is further configured to set the target regenerative braking force and the target electric braking force to values that substantially maximize a regenerative braking force that can be generated; and

the target braking force setting section is further configured to set the target
hydraulic braking force as a difference between the required braking force for the entire
10 vehicle and a sum of the target regenerative braking force and the target electric braking force.

16. The vehicle braking control system according to claim 14, wherein
the target braking force setting section is further configured to set a target braking
15 force apportioning ratio having a hydraulic braking force component and an electric braking force component;

the target braking force setting section is further configured to set the target
regenerative braking force to a value that substantially maximizes a regenerative braking
force that can be generated;

20 the target braking force setting section is further configured to set a difference between the required braking force for the entire vehicle and the target regenerative braking force as a combined target hydraulic/electric braking force; and

the target braking force setting section is further configured to set the target
hydraulic braking force and the target electric braking force by apportioning the combined
25 target hydraulic/electric braking force between the target hydraulic braking force and the target electric braking force based on the target braking force apportioning ratio.

17. The vehicle braking control system according to claim 14, wherein
the target braking force setting section is further configured to determine the target
30 regenerative braking force to substantially maximize a regenerative braking force that can be generated;

the target braking force setting section is further configured to determine the target electric braking force to substantially maximize an electric braking force that can be produced in view of the target regenerative braking force that was previously set and the required braking force for the entire vehicle; and

5 the target braking force setting section is further configured to set the target hydraulic braking force as a difference between the required braking force for the entire vehicle and a sum of the target regenerative braking force and the target electric braking force.

10 18. The vehicle braking control system according to claim 14, further comprising

 a braking force distribution ratio determining section configured to determine a braking force distribution ratio among a set of wheels at a start of braking from the target regenerative braking force, the target hydraulic braking force, and the target electric

15 braking force;

 the braking force distribution ratio determining section being further configured to determine the target braking force distribution ratio among the wheels from at least one operating condition of the vehicle; and

 the target braking force setting section is further configured to adjust the target
20 hydraulic braking force by asymptotically changing from the braking force distribution ratio among the wheels at the start of braking to a target braking force distribution ratio among the wheels with a passage of time from the start of the braking.

 19. A vehicle braking control system comprising:

25 braking mode selecting means for setting one of a plurality of braking modes as a selected braking mode, with each of the braking modes having a different braking control priority for a target regenerative braking force, a target hydraulic braking force and a target electric braking force;

 required braking force determining means for determining a required braking force
30 for an entire vehicle; and

 target braking force setting means for setting the target regenerative braking force, the target hydraulic braking force, and the target electric braking force based on the

braking control priority of the selected braking mode to produce the required braking force for the entire vehicle.

20. A method of controlling a vehicle braking control system comprising:
- 5 setting one of a plurality of braking modes as a selected braking mode, with each of the braking modes having a different braking control priority for a target regenerative braking force, a target hydraulic braking force and a target electric braking force;
- determining a required braking force for an entire vehicle; and
- setting the target regenerative braking force, the target hydraulic braking force, and
- 10 the target electric braking force based on the braking control priority of the selected braking mode to produce the required braking force for the entire vehicle.